THE group

The HENSLEY ENGINEERING GROUP

May 13, 2012

Dr. Abu Senkayi
United States Environmental Protection Agency
Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733
senkayi.abu@epa.gov

RE: *EPA Administrative Order*
Docket Number: CWA-06-2012-1807
NPDES Facility Number: NMU001778

Dear Dr. Senkayi:

Attached is the plan & schedule for compliance with the Administrative Order.

If there is any additional information that you feel should be provided or if you have any questions, please call.

Sincerely,

Ron E. Hensley
THE Group

EPA Administrative Order
Docket Number: CWA-06-2012-1807
NPDES Facility Number: NMU001778

Plan for Elimination of CAFO Waste Discharge to Municipal Storm Drain by EXPO NEW MEXICO

Prepared for

EXPO New Mexico
P.O. Box 8546
Albuquerque, NM 87198

Prepared by

THE Group
P.O. Box 21940
Albuquerque, NM 87154
(505) 514-0995

May 2012

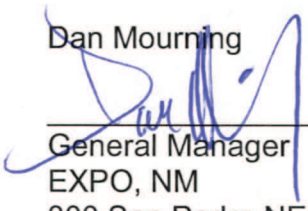
Acknowledgements

To: Dr. Abu Senkayi
6EN-WR/EPA Region 6
From: Dan Mourning
General Manager/Expo, NM
Date: May 8, 2012
Regarding: EPA Administrative Order

AO Docket Number: CWA-06-2012-1807
NPDES Facility Number: NMU001778

I certify under the penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.

Dan Mourning



Date: 5/11/12

General Manager
EXPO, NM
300 San Pedro NE
Albuquerque, NM 87108

I certify under the penalty of law that this document and all attachments were prepared under my direction or supervision.

Sheldon Greer P.E.

Date: 5/11/12

THE Group
300 Branding Iron Rd. SE
Rio Rancho, NM 87124

Table of Contents

Executive Summary

This plan is submitted in accordance with the requirements of Administrative Order Docket Number: CWA-06-2012-1807. This plan demonstrates the proposed improvements, schedule, costs, and availability of funds to provide compliance of the CAFO in accordance with 40 CFR Part 412. The plan provides assurance that discharge from the CAFO will not discharge to the City of Albuquerque MS4 storm drain as a result of the 25 year 24 hour rainfall event. The proposed schedule provides that date of compliance will be December 2013.

This plan is subject to the modifications of the final design and contracting process and is subject to approval by the EPA or its representative.

The supporting information and analyses included with this plan are intended to demonstrate the ability of the proposed site modifications to accomplish routing and containment of the prescribed storm event. The information includes site information, rainfall / runoff analyses, hydraulic analyses and preliminary plans.

The background information provides an overview of the facility and the infrastructure surrounding the site. The analyses of the storm water runoff for the facility are included to establish the design criteria for the flow and discharge containment of the 25 year 24 hour rainfall event. The analysis quantifies the runoff characteristics of the storm, flow rates at analysis points and direct runoff volumes from the CAFO area.

The proposed compliance schedule included in this plan is determined by the fiscal constraints placed upon EXPO New Mexico by the monetary appropriations process mandated by the State of New Mexico.

Background Information

The EXPO New Mexico site is located within the metropolitan area of Albuquerque, New Mexico (Coordinates: 35.0832, -106.5728). As shown on Figure 1 - Vicinity Map, the surrounding area is a fully developed urban community. The EXPO New Mexico site encompasses 224 acres, which includes a variety of uses, buildings, parking areas, barns, stalls and racing facilities. EXPO New Mexico is responsible for the New Mexico State Fair and operates a year-round service and events facility on the EXPO New Mexico site. EXPO New Mexico has leased the operation of a race track and casino on approximately 83 acres of the site to the Downs at Albuquerque, Inc.

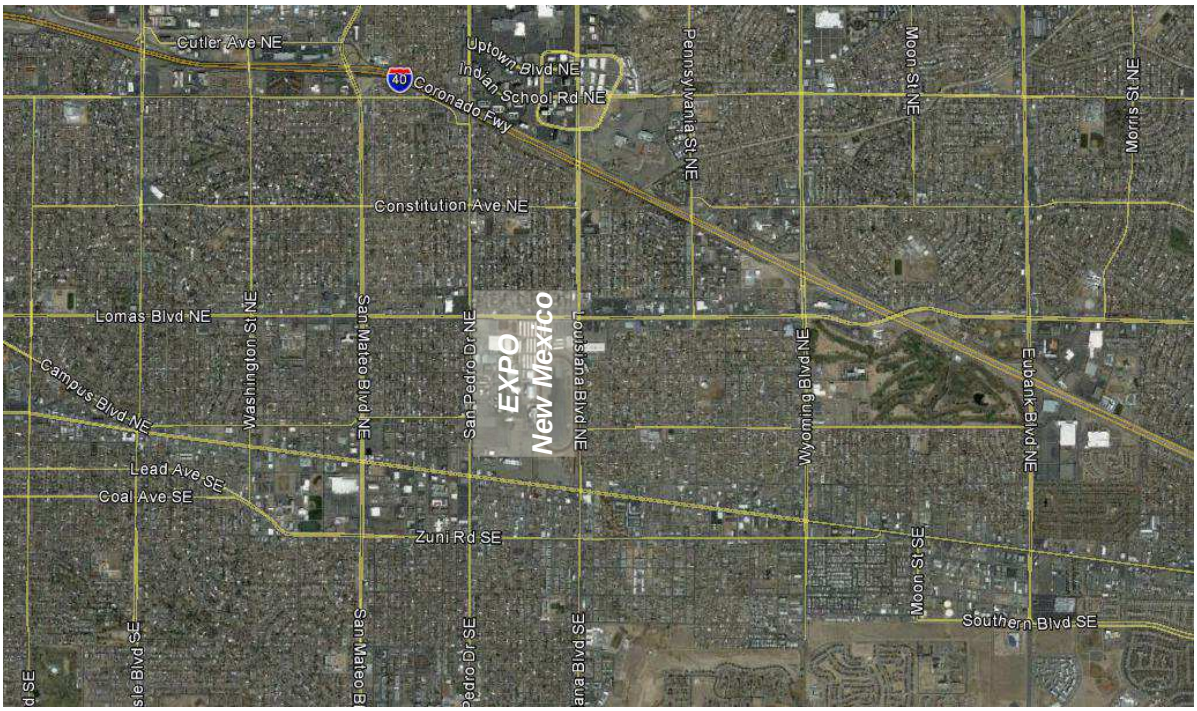


Figure 1 - Vicinity Map

The animal operations are limited to the 45.2 acres of the facility depicted on Figure 2 - CAFO Site Plan. The stabling, feeding and maintenance of the animals on site are conducted within the containment of the stables and barns of this area.

Figure 2 - CAFO Site Plan

Storm Water Management

The storm drains, pond facilities and systems of the surrounding area and within EXPO New Mexico are operated and maintained by the City of Albuquerque. This analysis predicts runoff from the CAFO area and evaluates the routing and storage requirements of the operations area. It is assumed for the analyses that the site is improved in accordance with this document.

Basin Characteristics

Historically, the runoff from the facility has flowed from east to west where it enters the City of Albuquerque storm drain system. For this study, the CAFO area was divided into four drainage basins. The basins are depicted on Figure 3 - Basin Map. The predominant soil type is Embudo-Tijeras complex. This is a gravelly fine sandy loam that is classified as hydrologic soil group B.

Hydrologic Analysis

The scope of this report includes a runoff and drainage analysis of the CAFO area of the EXPO New Mexico Facility. The direct runoff was determined using the Arid Land Hydrologic Modeling Program (AHYMO). The runoff analysis includes calculations for the 25 year 24 hour rainfall event.

Hydraulic Analysis

The hydraulic analysis included in this report demonstrates the catchment and containment of the site runoff within the drainage structures and retention pond. The runoff is directed to concentration points by site grading which flow to an improved channel through the northwest of the facility to a retention pond.

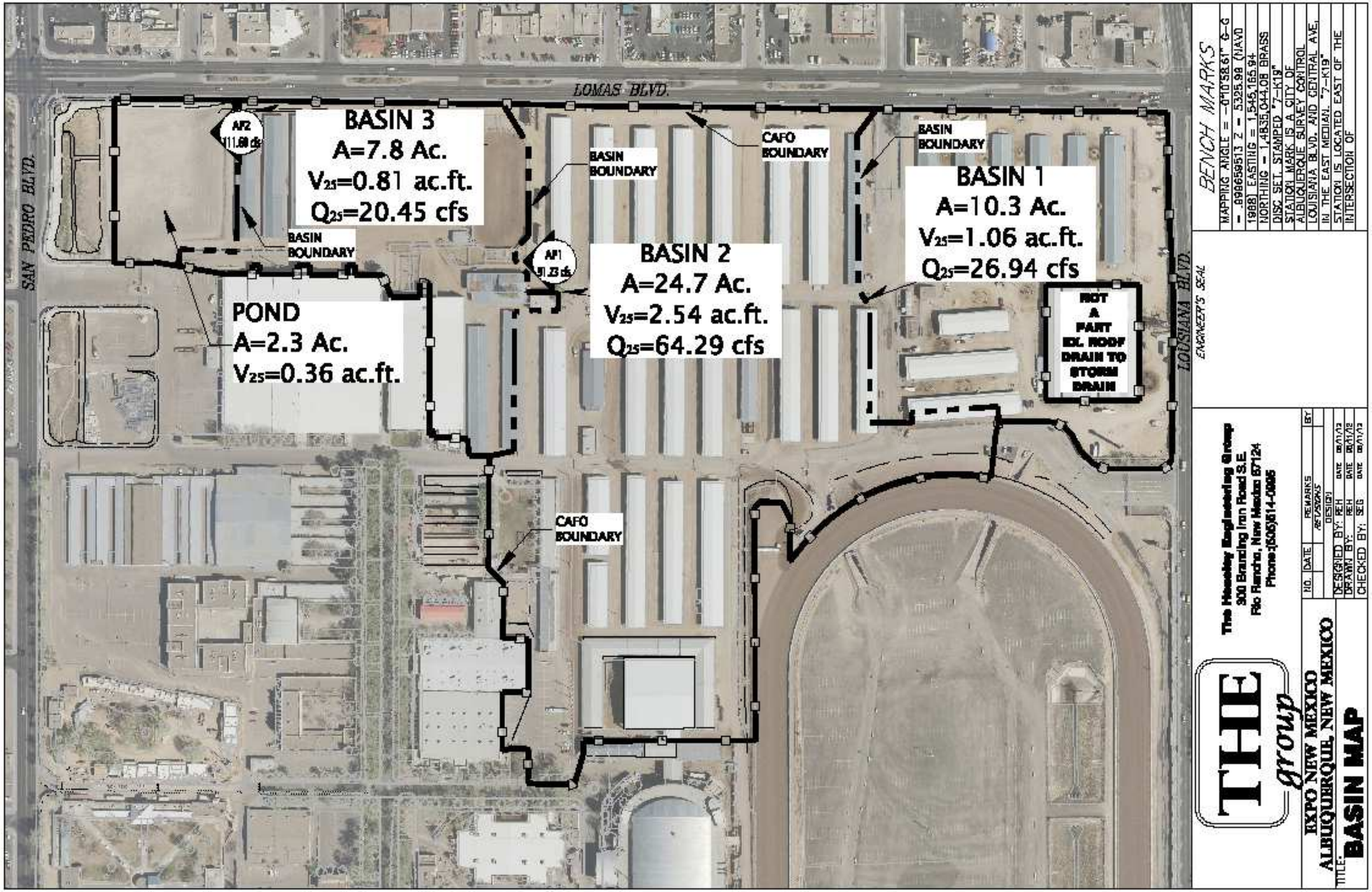


Figure 3 - Basin Map

Site Modifications

The proposed modifications to the site include excluding site flows from the municipal storm drain, site grading and retention pond construction. The modifications have been divided in several phases and divisions based on construction type and cost.

Storm Drain

As shown in Figure 4, there is a complex existing storm drain infrastructure in and around the site. The City of Albuquerque (COA) municipal storm drain infrastructure was installed to drain approximately 2.6 square miles of the neighborhoods, which directly border EXPO New Mexico to the East, to the COA Louisiana Detention Pond. An outfall for this pond was connected to the EXPO New Mexico storm drain system that was installed to provide for the drainage within EXPO New Mexico. The CAFO area of the facility will be temporarily disconnected from the storm drain by preventing the entry of storm water with a cap on the existing site inlets. After construction of a new storm drain through the site by the City of Albuquerque to outfall the Louisiana Detention Pond and routing of the on-site storm drain to the CAFO Retention Pond, the inlets will be reclaimed for improved flow routing within the site of more significant rainfall events.

Retention Facility

The runoff from the CAFO area will be routed via overland and channelized drainage to the CAFO Retention Pond. The retention pond will be constructed and maintained in accordance with NRCS design specifications to retain the site runoff from the 25 year 24 hour and smaller rainfall events, and shall prevent hydraulic connection to ground water which could result in the contamination of surface waters. The pond location utilizes existing surface improvements and the installation of a retention dam together with a geomembrane pond liner. The Grading & Drainage Plan included in the Appendices of this report depicts the proposed pond construction. The facility shall have a NRCS Engineer or Professional Engineer review the documentation and do a site evaluation a minimum of once every five (5) years to evaluate the integrity of the system.

Site Grading

The existing topography of CAFO area drains to the northwest. Minimal grading of the site will assure that runoff from the site will be directed to collection points and contained within overland drainage features and the CAFO Retention Pond. The Grading & Drainage Plan included in the Appendices of this report depicts the proposed site conditions.

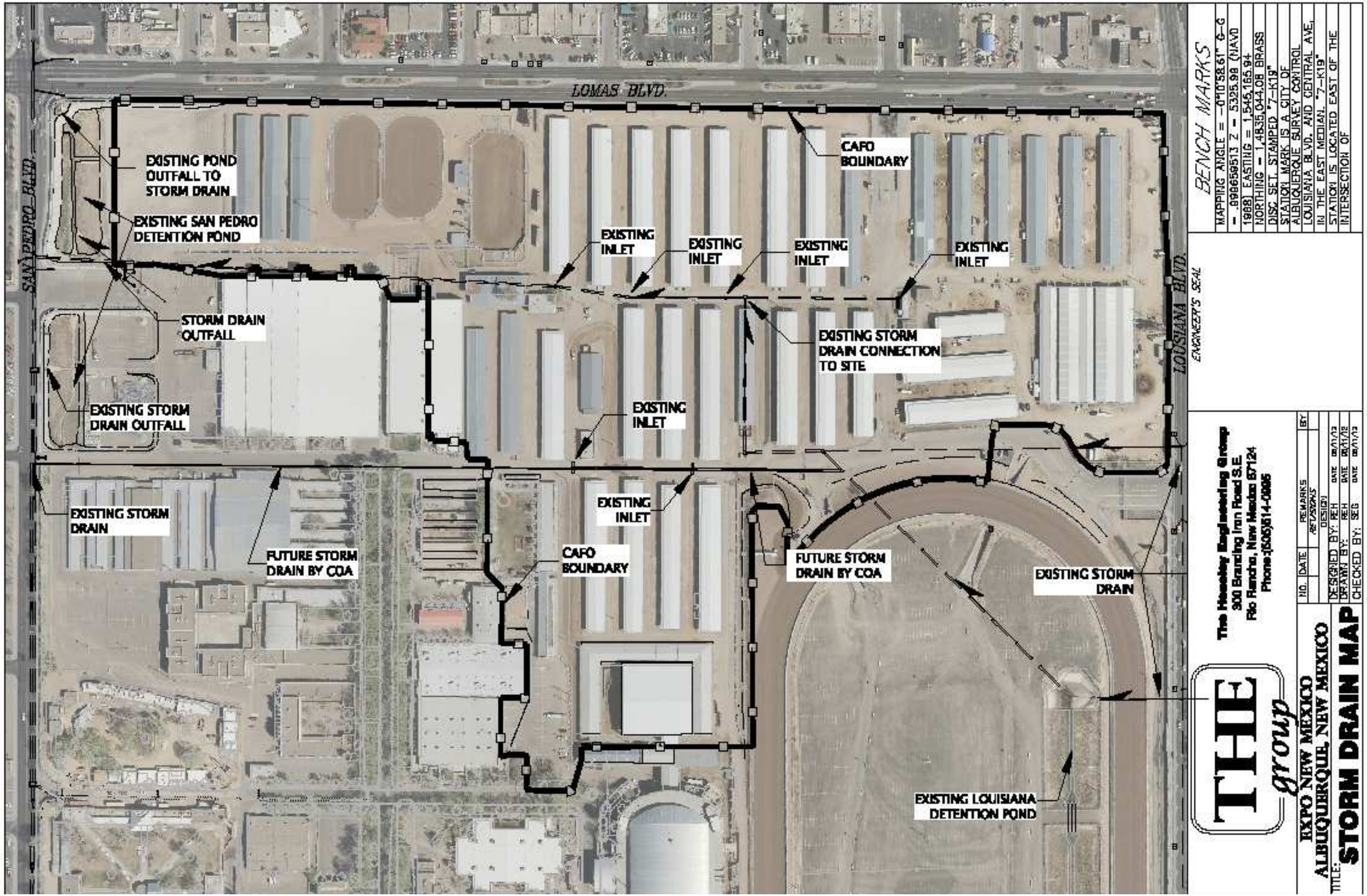


Figure 4 –Storm Drain Map

Schedule of Compliance/Improvements

Funding

The funds for the improvements outlined in this report are dependent on appropriation of funds by the State of New Mexico to EXPO New Mexico and the availability of funds to the City of Albuquerque for capital improvements. The disbursement of each fiscal year funds to EXPO New Mexico by the State of New Mexico occurs in July of the preceding year. The allocations for these projects will be requested from fiscal years 2013 and 2014 appropriations. The site modifications will be phased in divisions based on construction method and the costs of the project. The costs will require the phasing to split between the next two fiscal year budgets, however compliance is provided with the initial phase of improvements. The modification of the existing storm drain will only serve to improve drainage within the CAFO and will not affect the compliance achieved with the initial phase of improvements. The estimated costs associated with each phase are the following:

Storm Drain Inlets by EXPO New Mexico
Cost: $3,629.00

Retention Dam by EXPO New Mexico
Cost: $395,486.00

Surface Drainage by EXPO New Mexico
Cost: $5,450.00

New Storm Drain by City of Albuquerque
Cost: $239,370.00

Site Paving by EXPO New Mexico
Cost: $46,778.00

These estimates are preliminary and are subject to change based on final designs and contract conditions. They are provided as probable cost for budgeting consideration.

.

Implementation

The schedule shown below in Figure 5 provides the timeline for implementing the conditions of this plan

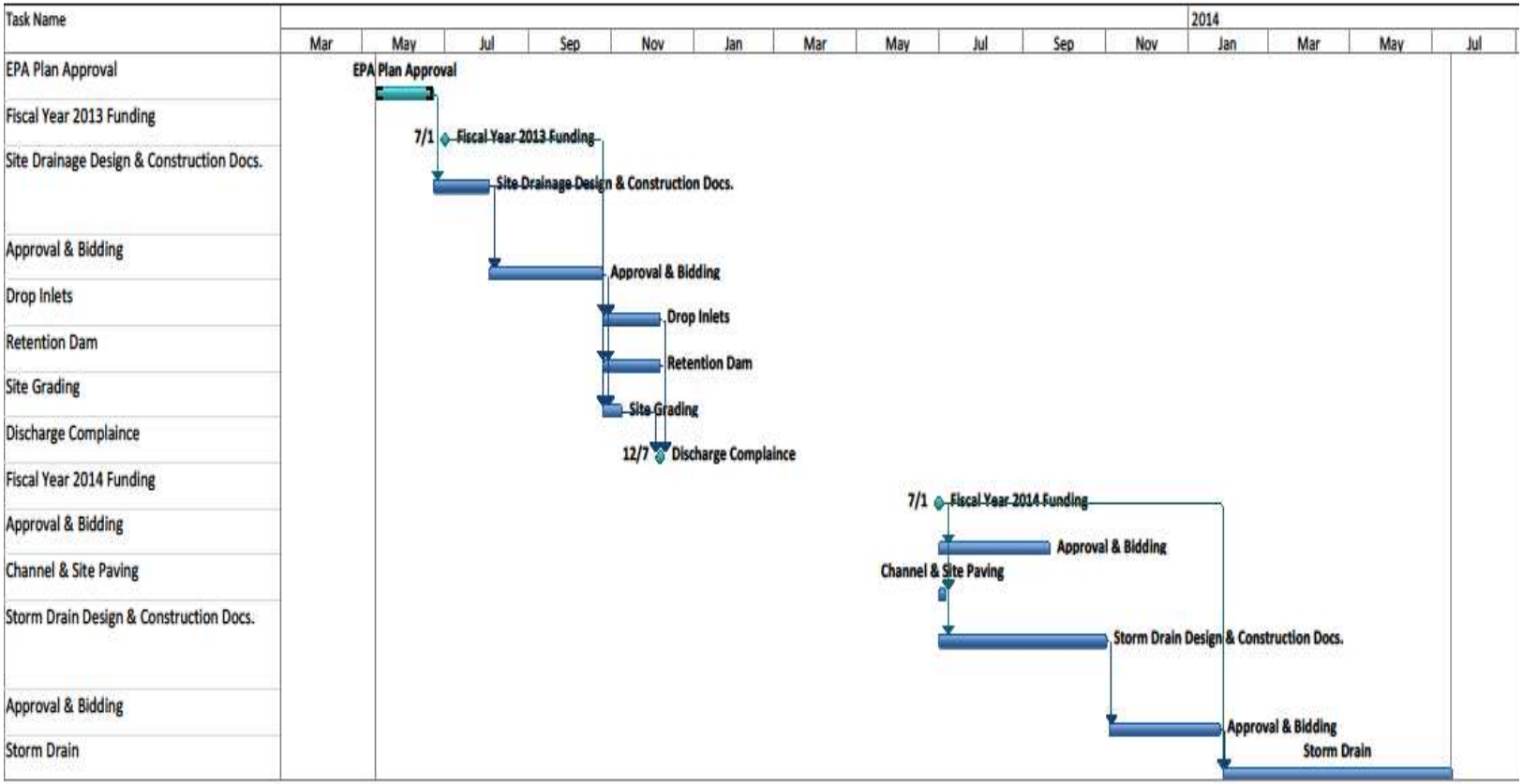


Figure 5 - Timeline

Conclusion

This plan demonstrates that EXPO New Mexico plans for the containment of discharge from the CAFO in accordance with 40 CFR Part 412. This plan to provides assurance that discharge from the CAFO area of the facility will not discharge to the City of Albuquerque MS4 during rainfall events up to the 25 year 24 hour storm.

The proposed compliance schedule included in this plan is determined by the fiscal constraints placed upon EXPO New Mexico by the monetary appropriations process mandated by the State of New Mexico.

Therefore, EXPO New Mexico requests that the compliance schedule proposed herein be incorporated and re-issued in a future administrative order.

Appendices

Appendix A- Runoff Analysis

NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico, US*
Coordinates: 35.0832, -106.5728
Elevation: 5299ft*

POINT PRECIPITATION FREQUENCY ESTIMATES

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval(years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.177 (0.153–0.207)	0.230 (0.197–0.269)	0.308 (0.263–0.360)	0.369 (0.313–0.430)	0.452 (0.382–0.525)	0.515 (0.434–0.600)	0.583 (0.487–0.678)	0.654 (0.543–0.760)	0.750 (0.617–0.872)	0.826 (0.675–0.961)
10-min	0.270 (0.232–0.316)	0.350 (0.299–0.409)	0.469 (0.400–0.548)	0.561 (0.476–0.654)	0.687 (0.581–0.799)	0.785 (0.660–0.913)	0.888 (0.741–1.03)	0.996 (0.826–1.16)	1.14 (0.938–1.33)	1.26 (1.03–1.46)
15-min	0.335 (0.288–0.391)	0.434 (0.371–0.507)	0.581 (0.495–0.679)	0.695 (0.590–0.810)	0.852 (0.720–0.991)	0.972 (0.819–1.13)	1.10 (0.919–1.28)	1.23 (1.02–1.43)	1.41 (1.16–1.65)	1.56 (1.27–1.81)
30-min	0.451 (0.387–0.527)	0.584 (0.499–0.683)	0.783 (0.667–0.915)	0.936 (0.795–1.09)	1.15 (0.969–1.33)	1.31 (1.10–1.52)	1.48 (1.24–1.72)	1.66 (1.38–1.93)	1.90 (1.57–2.22)	2.10 (1.72–2.44)
60-min	0.558 (0.479–0.652)	0.723 (0.617–0.845)	0.969 (0.826–1.13)	1.16 (0.984–1.35)	1.42 (1.20–1.65)	1.62 (1.36–1.89)	1.83 (1.53–2.13)	2.06 (1.71–2.39)	2.36 (1.94–2.74)	2.60 (2.12–3.02)
2-hr	0.647 (0.549–0.777)	0.829 (0.703–0.997)	1.10 (0.928–1.32)	1.31 (1.10–1.56)	1.61 (1.34–1.91)	1.85 (1.53–2.19)	2.10 (1.73–2.49)	2.36 (1.93–2.80)	2.73 (2.21–3.23)	3.03 (2.43–3.60)
3-hr	0.689 (0.589–0.822)	0.875 (0.746–1.04)	1.15 (0.978–1.36)	1.36 (1.15–1.61)	1.66 (1.40–1.97)	1.90 (1.59–2.25)	2.16 (1.80–2.55)	2.43 (2.00–2.87)	2.80 (2.29–3.31)	3.11 (2.52–3.68)
6-hr	0.802 (0.690–0.950)	1.01 (0.869–1.20)	1.30 (1.12–1.54)	1.53 (1.31–1.80)	1.84 (1.57–2.17)	2.09 (1.77–2.45)	2.35 (1.98–2.76)	2.61 (2.19–3.07)	2.99 (2.48–3.50)	3.28 (2.70–3.86)
12-hr	0.887 (0.770–1.02)	1.12 (0.972–1.29)	1.42 (1.23–1.63)	1.65 (1.43–1.90)	1.97 (1.69–2.26)	2.21 (1.90–2.54)	2.47 (2.10–2.83)	2.73 (2.31–3.14)	3.09 (2.59–3.55)	3.37 (2.80–3.89)
24-hr	1.02 (0.894–1.16)	1.27 (1.12–1.45)	1.59 (1.40–1.82)	1.85 (1.62–2.10)	2.19 (1.92–2.50)	2.46 (2.14–2.79)	2.73 (2.38–3.10)	3.01 (2.60–3.42)	3.39 (2.91–3.84)	3.68 (3.14–4.18)
2-day	1.07 (0.943–1.21)	1.34 (1.18–1.52)	1.67 (1.48–1.89)	1.93 (1.71–2.18)	2.29 (2.01–2.58)	2.56 (2.25–2.89)	2.85 (2.49–3.21)	3.13 (2.72–3.54)	3.52 (3.04–3.98)	3.82 (3.28–4.32)
3-day	1.16 (1.04–1.29)	1.45 (1.30–1.61)	1.79 (1.61–1.99)	2.06 (1.85–2.29)	2.43 (2.17–2.70)	2.71 (2.42–3.01)	3.00 (2.66–3.33)	3.29 (2.91–3.65)	3.68 (3.24–4.09)	3.97 (3.48–4.42)
4-day	1.25 (1.14–1.37)	1.56 (1.42–1.70)	1.91 (1.74–2.09)	2.19 (1.99–2.40)	2.57 (2.33–2.81)	2.86 (2.59–3.13)	3.15 (2.84–3.45)	3.44 (3.10–3.77)	3.83 (3.43–4.20)	4.13 (3.68–4.53)
7-day	1.43 (1.31–1.56)	1.78 (1.62–1.93)	2.17 (1.98–2.36)	2.47 (2.25–2.69)	2.87 (2.62–3.12)	3.17 (2.89–3.44)	3.47 (3.15–3.77)	3.76 (3.41–4.09)	4.14 (3.74–4.51)	4.43 (3.98–4.83)
10-day	1.58 (1.45–1.72)	1.96 (1.80–2.14)	2.41 (2.21–2.61)	2.75 (2.53–2.99)	3.22 (2.95–3.48)	3.56 (3.26–3.85)	3.91 (3.57–4.23)	4.25 (3.87–4.61)	4.70 (4.25–5.10)	5.03 (4.54–5.47)
20-day	1.99 (1.82–2.18)	2.47 (2.27–2.70)	3.01 (2.76–3.28)	3.41 (3.13–3.71)	3.93 (3.59–4.28)	4.30 (3.93–4.68)	4.66 (4.25–5.07)	5.01 (4.55–5.44)	5.44 (4.93–5.92)	5.75 (5.20–6.26)
30-day	2.39 (2.19–2.59)	2.97 (2.72–3.21)	3.58 (3.26–3.87)	4.03 (3.69–4.36)	4.59 (4.20–4.96)	5.00 (4.56–5.39)	5.38 (4.91–5.81)	5.74 (5.23–6.20)	6.18 (5.61–6.68)	6.49 (5.89–7.02)
45-day	2.92 (2.69–3.17)	3.62 (3.34–3.92)	4.32 (3.98–4.68)	4.82 (4.43–5.21)	5.43 (5.00–5.87)	5.85 (5.38–6.33)	6.23 (5.73–6.74)	6.58 (6.04–7.11)	6.97 (6.40–7.55)	7.22 (6.63–7.82)
60-day	3.36 (3.10–3.65)	4.17 (3.84–4.52)	4.97 (4.59–5.39)	5.55 (5.12–6.01)	6.24 (5.76–6.76)	6.72 (6.20–7.28)	7.16 (6.60–7.76)	7.56 (6.96–8.20)	8.01 (7.38–8.71)	8.31 (7.66–9.03)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

HYDORLOGIC ANALYSIS

Summary

LOCATION ALBUQUERQUE
RAINFALL TYPE= 24 HOUR DEPTH = 2.190

FROM TO HYDROGRAPH ID IDENTIFICATION NO.	ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE
CAFO1 -	1	0.01616	26.94	1.062	1.23258	1.499	2.605 PER IMP= 50.00
CAFO2 -	2	0.03857	64.29	2.535	1.23258	1.499	2.604 PER IMP= 50.00
CAFO3 -	3	0.01226	20.45	0.806	1.23258	1.499	2.605 PER IMP= 50.00
POND -	4	0.00357	7.60	0.358	1.87978	1.499	3.324 PER IMP= 100.00
AP1 1& 2	5	0.05473	91.23	3.598	1.23258	1.499	2.605
AP2 5& 3	6	0.06699	111.68	4.404	1.23258	1.499	2.605
POND 6& 4	7	0.07056	119.28	4.762	1.26535	1.499	2.641

Analysis

```
LOCATION                        ALBUQUERQUE
RAINFALL  TYPE                  24 HOUR
DEPTH                           2.190 IN.

   City of Albuquerque soil infiltration values (LAND FACTORS) used for computations.
   Land Treatment        Initial Abstr.(in)      Unif. Infilt.(in/hour)
      A                        0.65                    1.67
      B                        0.50                    1.25
      C                        0.35                    0.83
      D                        0.10                    0.04

   RAINFALL TYPE=2 RAIN QUARTER=0.0
   RAIN ONE=1.42 IN RAIN SIX=1.84 IN
   RAIN DAY=2.19 IN DT=0.0333 HRS

   COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
   COMPUTE NM HYD          ID=1 HYD NO=CAFO1 DA=0.016161 SQ MI
                           PER A=0 PER B=10 PER C=40 PER D=50
                           TP=-0.1333 HR MASS RAIN=-1

   K =  .072649HR   TP =  .133300HR   K/TP RATIO =  .545000    SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =  31.902   CFS   UNIT VOLUME =   .9990      B =  526.28     P60 = 1.4200
   AREA =     .008081 SQ MI   IA =   .10000 INCHES   INF =   .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  .033300

   K =  .112837HR   TP =  .133300HR   K/TP RATIO =  .846489    SHAPE CONSTANT, N =  4.206768
   UNIT PEAK =  22.352   CFS   UNIT VOLUME =   .9996      B =  368.73     P60 = 1.4200
   AREA =     .008081 SQ MI   IA =   .38000 INCHES   INF =   .91400 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  .033300

      RUNOFF VOLUME =    1.23258 INCHES    =      1.0624 ACRE-FEET
      PEAK DISCHARGE RATE =     26.94 CFS  AT   1.499 HOURS   BASIN AREA =   .0162 SQ. MI.

   COMPUTE NM HYD          ID=2 HYD NO=CAFO2 DA=0.038567 SQ MI
                           PER A=0 PER B=10 PER C=40 PER D=50
                           TP=-0.1333 HR MASS RAIN=-1

   K =  .072649HR   TP =  .133300HR   K/TP RATIO =  .545000    SHAPE CONSTANT, N =  7.106420
   UNIT PEAK =  76.132   CFS   UNIT VOLUME =   .9992      B =  526.28     P60 = 1.4200
   AREA =     .019284 SQ MI   IA =   .10000 INCHES   INF =   .04000 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  .033300


   K =  .112837HR   TP =  .133300HR   K/TP RATIO =  .846489    SHAPE CONSTANT, N =  4.206768
   UNIT PEAK =  53.341   CFS   UNIT VOLUME =   .9999      B =  368.73     P60 = 1.4200
   AREA =     .019284 SQ MI   IA =   .38000 INCHES   INF =   .91400 INCHES PER HOUR
   RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  .033300

   RUNOFF VOLUME =    1.23258 INCHES    =      2.5353 ACRE-FEET
   PEAK DISCHARGE RATE =     64.29 CFS  AT   1.499 HOURS   BASIN AREA =   .0386 SQ. MI.

   COMPUTE NM HYD          ID=3 HYD NO=CAFO3 DA=0.012261 SQ MI
                           PER A=0 PER B=10 PER C=40 PER D=50
                           TP=-0.1333 HR MASS RAIN=-1

      K =  .072649HR   TP =  .133300HR   K/TP RATIO =  .545000    SHAPE CONSTANT, N =  7.106420
      UNIT PEAK =  24.204   CFS   UNIT VOLUME =   .9989      B =  526.28     P60 = 1.4200
      AREA =     .006131 SQ MI   IA =   .10000 INCHES   INF =   .04000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  .033300


      K =  .112837HR   TP =  .133300HR   K/TP RATIO =  .846489    SHAPE CONSTANT, N =  4.206768
      UNIT PEAK =  16.958   CFS   UNIT VOLUME =   .9994      B =  368.73     P60 = 1.4200
      AREA =     .006131 SQ MI   IA =   .38000 INCHES   INF =   .91400 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  .033300

     RUNOFF VOLUME =    1.23258 INCHES    =      .8060 ACRE-FEET
```

PEAK DISCHARGE RATE = 20.45 CFS AT 1.499 HOURS BASIN AREA = .0123 SQ. MI.

COMPUTE NM HYD ID=4 HYD NO=POND DA=0.003573 SQ MI
PER A=0 PER B=0 PER C=0 PER D=100
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 14.106 CFS UNIT VOLUME = .9985 B = 526.28 P60 = 1.4200
AREA = .003573 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

ADD HYD ID=5 HYD NO=AP1 IDS=1 AND 2

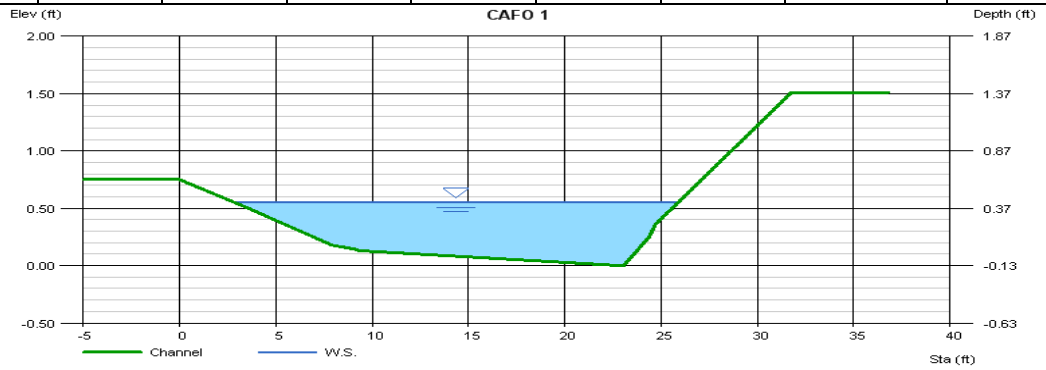
RUNOFF VOLUME = 1.23258 INCHES = 3.5977 ACRE-FEET
PEAK DISCHARGE RATE = 91.23 CFS AT 1.499 HOURS BASIN AREA = .0547 SQ. MI

ADD HYD ID=6 HYD NO=AP2 IDS=5 AND 3
RUNOFF VOLUME = 1.23258 INCHES = 4.4037 ACRE-FEET
PEAK DISCHARGE RATE = 111.68 CFS AT 1.499 HOURS BASIN AREA = .0670 SQ. MI..

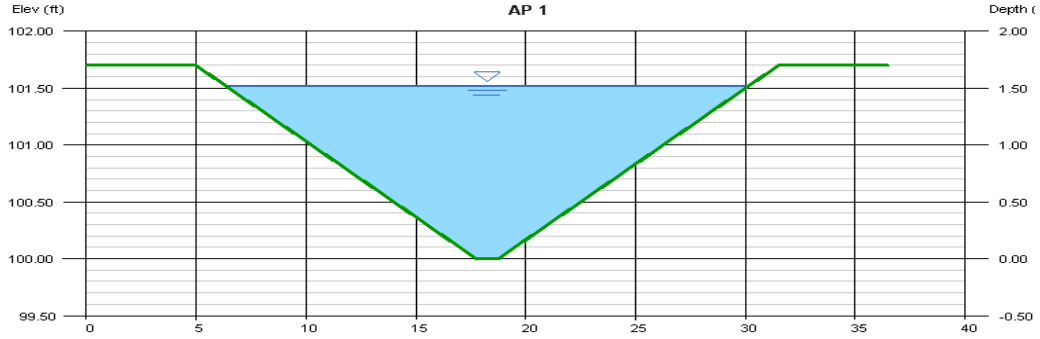
ADD HYD ID=7 HYD NO=POND IDS=6 AND 4

Appendix B- Hydraulic Analysis
Channel Flow

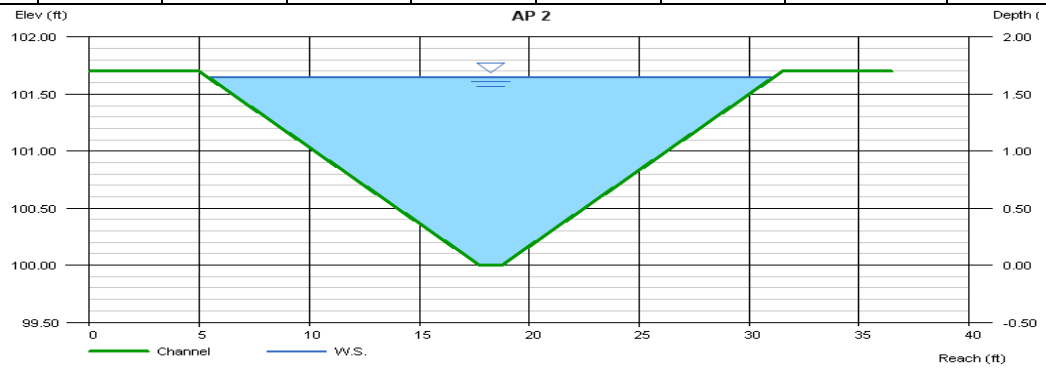
From CAFO Area 1								
Depth	Q	Area	Slope	Veloc	Wp	Yc	TopWidth	Energy
(ft)	(cfs)	(sqft)	(ft/ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
0.42	26.94	8.912	0.01	3.02	23.09	0.38	23.02	0.56



AP1								
Depth	Q	Area	Slope	Veloc	Wp	Yc	TopWidth	Energy
(ft)	(cfs)	(sqft)	(ft/ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
1.52	91.23	18.85	0.01	4.84	24	1.5	23.8	1.88



AP2								
Depth	Q	Area	Slope	Veloc	Wp	Yc	TopWidth	Energy
(ft)	(cfs)	(sqft)	(ft/ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
1.52	91.23	18.85	0.01	4.84	24	1.5	23.8	1.88



Pond Volume

Elevation	Depth (ft)	Volume (ac.ft.)
5271.45	0.00	0.00
5272.00	0.55	0.04
5273.00	1.55	0.59
5274.00	2.55	1.60
5275.00	3.55	2.74
5276.00	4.55	4.01
5276.56	5.11	4.77
5277.00	5.55	5.39
5277.45	6.00	6.06

Appendix C- Cost Estimates

EXPO New Mexico				
Retention Pond Estimate				
Description	TOTAL QUANTITY	UNIT	UNIT COST	TOTAL COST
Construction Staking, compl.	1	%	1.40%	$4,812.31
Construction Surveying, compl	1	%	1.31%	$4,502.94
Construction Mobilization,compl.	1	%	4.77%	$16,396.21
Construction Demobilization,compl.	1	%	0.30%	$1,031.21
12' X 3' X 3' GABION BASKET	150	EA	$145.00	$21,750.73
12' X 3'X 1.5' GABION BASKET	30	EA	$98.67	$2,960.20
GABION FILL MATERIAL	515	CY	$606.80	$312,503.15
6' X 150' (100 SY) ROLL MESH	1	EA	$431.63	$431.63
POLY POND LINER	4320	SF	$0.52	$2,265.88
MISCELLANEOUS	1	EA	$3,824.54	$3,824.54
TOTAL BEFORE TAXES				$370,478.80
NMGRT			6.75%	$25,007.32
TOTAL				$395,486.12

EXPO New Mexico				
Inlet Capping Estimate				
Description	TOTAL QUANTITY	UNIT	UNIT COST	TOTAL COST
Construction Staking, compl.	1	%	1.40%	$44.16
Construction Surveying, compl	1	%	1.31%	$41.32
Construction Mobilization,compl.	1	%	4.77%	$150.46
Construction Demobilization,compl.	1	%	0.30%	$9.46
Asphalt Concrete, 2 inch thick	167	SY	$14.21	$2,367.58
POLY POND LINER	1500	SF	$0.52	$786.76
TOTAL BEFORE TAXES				$3,399.75
NMGRT			6.75%	$229.48
TOTAL				$3,629.23

EXPO New Mexico

Site Grading Estimate

Description	TOTAL QUANTITY	UNIT	UNIT COST	TOTAL COST
Construction Staking, compl.	1	%	1.40%	$66.32
Construction Surveying, compl	1	%	1.31%	$62.05
Construction Mobilization,compl.	1	%	4.77%	$225.95
Construction Demobilization,compl.	1	%	0.30%	$14.21
Grading areas not to be paved	1500	SY	$3.16	$4,736.97
TOTAL BEFORE TAXES				$5,105.51
NMGRT			6.75%	$344.62
TOTAL				$5,450.13

EXPO New Mexico

Paving Estimate

Description	TOTAL QUANTITY	UNIT	UNIT COST	TOTAL COST
Construction Staking, compl.	1	%	1.40%	$554.56
Construction Surveying, compl	1	%	1.31%	$518.91
Construction Mobilization,compl.	1	%	4.77%	$1,889.45
Construction Demobilization,compl.	1	%	0.30%	$118.83
Tact Coat, cationic emulsified asphalt	2788	SY	$0.40	$1,127.39
Asphalt Concrete, 2 inch thick	2788	SY	$14.21	$39,611.11
TOTAL BEFORE TAXES				$43,820.25
NMGRT			6.75%	$2,957.87
TOTAL				$46,778.12

Appendix D – Preliminary Improvement Documents

Sheet 1 Preliminary Grading & Drainage Plan – Cover

Sheet 2 Preliminary Grading & Drainage Plan

Sheet 3 Preliminary Grading & Drainage Plan

Sheet 4 Preliminary Grading & Drainage Plan

Sheet 5 Preliminary Grading & Drainage Details